

REMARKS

Claims 1-18 were rejected under 35 U.S.C. § 103(a) as being unpatentable over the Slack et al references (U.S. Patent 5,955,609 or U.S. Patent 6,127,308) in view of the Scholl et al reference (U.S. Patent 5,124,370), and further in view of the Slack et al reference (U.S. Patents 5,663,272 or 6,887,399 or 6,991,746), or the Rosthauser et al reference (U.S. Patent 5,783,652), or the Markusch et al reference (U.S. Patent 6,482,913).

U.S. Patent 5,955,609 (Slack et al) and U.S. Patent 6,127,308 (Slack et al) disclose a trimer catalyst system for aliphatic and aromatic isocyanates. These two references are from the same patent family. In particular, U.S. Patent 6,127,308 is a divisional of the application which matured into U.S. Patent 5,955,609. Thus, the disclosures of these two patents are identical, but the claims are different. For convenience, Applicants' comments will be directed to U.S. Patent 5,955,609 unless otherwise noted.

The trimer catalyst system of U.S. Patent 5,955,609 comprises (A) a compound selected from the group consisting of (i) lithium salts of aliphatic or aromatic monocarboxylic acids or dicarboxylic acids, (ii) lithium salts of hydroxyl group containing compounds which have from 1 to 3 hydroxyl groups per compound, in which the hydroxyl groups are attached directly to an aromatic ring, (iii) lithium hydroxide, and (iv) mixtures thereof; (B) at least one allophanate catalyst; and (C) at least one organic compound containing at least one hydroxyl group. This trimer catalyst system is broadly described as being suitable for the trimerization of both aliphatic isocyanates and aromatic isocyanates.

Polyisocyanate mixtures of the diphenylmethane series and a process for their preparation are disclosed by U.S. Patent 5,124,370 (the Scholl et al reference) in which the polyisocyanate mixtures contain isocyanurate groups. More specifically, the liquid polyisocyanate mixtures which contain isocyanurate groups have a NCO group content of 15 to 30% by weight, and are obtained by partial trimerization of the isocyanate groups of polyisocyanate mixtures of the diphenylmethane series. These polyisocyanate mixtures contain from 80 to 100% by weight of MDI isomers (i.e. monomeric MDI) and 0 to 20% by weight of polymeric MDI. The MDI isomers comprise from 40 to 80% by weight of the 4,4'-isomer, from 20 to 60% by weight of

the 2,4'-isomer and 0 to 8% by weight of the 2,2'-isomer, with the sum of the %'s by weight adding up to 100% by weight. See column 1, line 64 through column 2, line 9. In an optional embodiment, a hydroxyl-functional component may be present during the trimerization. The trimerization reaction is terminated by addition of a catalyst poison. (See column 2, lines 29-32.) Allophanate groups are not present in the polyisocyanate mixtures of the Scholl et al reference.

U.S. Patent 5,663,272 describes allophanate-modified diphenylmethane diisocyanates and a process for their production. These allophanate-modified diisocyanates are storage stable liquids at 25°C. These allophanate-modified MDIs are prepared by reacting a monoisocyanate with an organic compound having at least two hydroxyl groups and a molecular weight of from about 60 to about 6000, followed by reacting this product with a diphenylmethane diisocyanate having a specific isomer distribution, thus forming the liquid allophanate-modified MDI which has an NCO group content of 12 to 30% by weight. See column 2, lines 50-59. The specific isomer of diphenylmethane diisocyanate contains from 0 to 60% by weight of the 2,4'-isomer of MDI, less than 6% by weight of the 2,2'-isomer of MDI, with the balance being the 4,4'-isomer. (See column 2, lines 59-63.) Thus, the 4,4' isomer content ranges from 40 to 100% by weight. The liquid allophanate-modified MDIs may be further reacted with an organic material which contains two or more hydroxyl or amino groups, a low MW diol, or a combination thereof, to form a prepolymer. (See column 2, line 64 through column 3, line 2.)

The other two Slack et al references (U.S. Patent 6,887,399 and U.S. Patent 6,991,746) belong to the same patent family. The '746 patent is a divisional of the '399 patent. Thus, these two patents have the same disclosure but different claims. For convenience, Applicants' will direct all their comments to the '399 patent unless otherwise noted.

The Slack et al reference ('399) relates to polymeric allophanates of diphenylmethane diisocyanate, prepolymers of these polymeric allophanates, and processes for the preparation of these products. These are higher functionality polymeric allophanate products prepared from an allophanate-modified diphenylmethane diisocyanate which comprises the reaction product of at least one OH group containing compound, and diphenylmethane diisocyanate which contains

from 0 to 60% by weight of the 2,4'-isomer, less than 6% of the 2,2'-isomer and the balance (i.e. 34 to 100%) being the 4,4'-isomer. The allophanate modified MDI is held at a temperature of 20 to 70°C for a time ranging from 1 hour to 30 days to form the polymeric allophanate modified MDI, with a catalyst stopper being added after the polymeric allophanate modified MDI is formed.

The Rosthauser et al reference (U.S. Patent 5,783,652) describes how to improve the reactivity of urethane prepolymers of allophanate-modified MDI. The addition of epoxide increases the reactivity of these prepolymers. More specifically, the '652 patent describes a mixture of A) 90 to 99.5% of a stable, liquid prepolymer of an allophanate-modified MDI, and B) 0.5 to 10% by weight of at least one epoxide having an epoxide equivalent weight of 44 to 400. The allophanate-modified MDI is prepared from an isomeric mixture of MDI comprising (i) 0 to 60% by wt. of the 2,4'-isomer, (ii) less than 6% by wt. of the 2,2'-isomer and (iii) the balance (i.e. 34 to 100%) being the 4,4'-isomer.

U.S. Patent 6,482,913 (the Markusch et al reference) discloses liquid MDI adducts which are freeze stable. These liquid isocyanate compositions comprise (A) an allophanate-modified MDI having an NCO group content of 16 to 30%, (B) a low molecular weight branched aliphatic dihydroxyl compound and (C) an epoxide functional compound. The allophanate-modified MDI (A) is the reaction product of (1) diphenylmethane diisocyanate having an isomer distribution of 0 to 20% by weight of the 2,4'-isomer, 0 to 2% by weight of the 2,2'-isomer and the balance (i.e. 78 to 100% by weight) being the 4,4'-isomer, with (2) an aliphatic alcohol. See column 4, lines 3-10 and lines 22-28. These allophanate modified MDIs are further reacted with (B) a low MW branched aliphatic dihydroxy compound and (C) an epoxide. Thus, the Markusch et al reference is actually directed to prepolymers of allophanate-modified MDI. Products containing both allophanate groups and trimer groups are not disclosed by the Markusch et al reference.

Applicants respectfully submit that this combination of references does not render the presently claimed invention obvious to one of ordinary skill in the art.

The Slack et al references (U.S. Patents 5,955,609 and 6,127,308) disclose a trimer catalyst system for both aliphatic and aromatic isocyanates. This trimer catalyst system comprises (A) a compound selected from one of three specific

groups of lithium compounds or lithium salts, (B) an allophanate catalyst, and (C) an organic compound which contains at least one hydroxyl group. Diphenylmethane diisocyanate is disclosed as one suitable diisocyanate therein (see column 7, lines 13, 24 and 33).

In the preferred embodiments of U.S. Patent 5,955,609, the isocyanates are hexamethylene diisocyanate, diphenylmethane diisocyanate and toluene diisocyanate. None of the final products in this reference were freeze-stable liquids. (See column 4, lines 11-12.) As disclosed at column 4, lines 13-29, certain TDI products were found to be freeze-stable liquids. These freeze-stable TDI products were not, however, the subject of U.S. 5,955,609. None of the MDI products were described as freeze-stable liquids.

The working examples which used diphenylmethane diisocyanate (i.e. Examples 10, 14 and 15) used diphenylmethane diisocyanate which consists of 98% by wt. of the 4,4'-isomer and 2% by wt. of the 2,4'-isomer (column 7, lines 50-52). Applicants respectfully request that this MDI composition is clearly outside the scope of the presently claimed invention.

The presently claimed stable liquid, allophanate-modified, partially trimerized diphenylmethane diisocyanates require that the MDI component a)(1) contain (i) from 10 to 40% by wt. of the 2,4'-isomer, (ii) from 0 to 6% by wt. of the 2,2'-isomer and (iii) from 54 to 90% by of the 4,4'-isomer. Thus, it is evident that there is no overlap between the required MDI component and that of the Slack et al references (U.S. Patents 5,955,609 and 6,127,308).

It is respectfully submitted that the Scholl et al reference, in the broadest sense, discloses that liquid products which contain isocyanurate groups can be prepared from a polyisocyanate mixture containing 80 to 100% by wt. of monomeric MDI and 0 to 20% by wt. of polymeric MDI. Isocyanurate groups are formed by trimerization of isocyanate groups. The monomeric MDI of this polyisocyanate mixture contains from 40 to 80% by wt. of the 4,4'-isomer, from 20 to 60% by wt. of the 2,4'-isomer, and from 0 to 8% by wt. of the 2,2'-isomer, with the sum of these

totaling 100% by weight of the monomer. (See column 2, lines 18-27.) Thus, overall these PMDI mixtures in the Scholl et al reference contain from 0 to 20% by wt. of polymeric MDI, from 32 to 80% by wt. of the 4,4'-isomer of MDI, from 16 to 60% by wt. of the 2,4'-isomer of MDI and from 0 to 8% by wt. of the 2,2'-isomer of MDI.

This reference contains three specific examples of different PMDI mixtures. See column 4, line 65 through column 5, line 12. The first mixture (Isocyanate 1) comprises 56% of the 4,4'-isomer, 29% of the 2,4'-isomer, 5% of the 2,2'-isomer and 10% of polymeric MDI; the second mixture (Isocyanate 2) comprises 46-47% of the 4,4'-isomer, 52-53% of the 2,4'-isomer and less than 1% of the 2,2'-isomer; and the third mixture (Isocyanate 3) comprises 59% of the 4,4'-isomer, 23% of the 2,4'-isomer 3% of the 2,2'-isomer and 15% of polymeric MDI.

Applicants respectfully submit that none of these specific examples of PMDI mixtures fall within the scope of the presently required MDI composition a)(1). Obviously neither the first and third MDI compositions of the Scholl et al reference satisfy the present requirements as these also contain 10% by wt. and 15% by wt. of polymeric MDI, respectively. It is evident from Applicants' claim language that the MDI compositions a)(1) of the present invention do not contain any polymeric MDI as the claim language requires that the sum of the 2,2'-isomer, the 2,4'-isomer and the 4,4'-isomer totals 100% by wt. of a)(1).

The second MDI composition of the Scholl et al reference is the only one described therein that is 100% monomeric MDI. This composition, however, contains 46-47% of the 2,4'-isomer, 52 to 53% of the 4,4'-isomer and less than 1% by wt. of the 2,2'-isomer. Applicants MDI compositions contain a maximum of 40% by wt. of the 2,4'-isomer and a minimum of 54% by wt. of the 4,4'-isomer. It is therefore readily apparent that this MDI composition is also outside the scope of that required by Applicants claims. Accordingly, substituting this MDI composition for that of the Slack et al references also does not lead one skilled in the art to Applicants invention.

It appears that the Examiner's position is that it would be "obvious" to one of ordinary skill in the art to combine the MDI mixtures of the Scholl et al reference with the process and catalyst system of the Slack et al reference (either the '609 reference or the '308 reference) to "arrive at" the presently claimed invention.

Applicants respectfully submit that this combination does not result in the presently claimed invention. As set forth above, the present claim language requires an isomeric mixture of MDI which comprises (i) from 10 to 40% by wt. of the 2,4'-isomer, (ii) from 0 to 6% by wt. of the 2,2'-isomer and (iii) from 54 to 90% by wt. of the 4,4'-isomer, with the sum of these totaling 100% by wt. of the MDI. The Slack et al references disclose an isomeric mixture of MDI which comprises 98% by wt. of the 4,4'-isomer and 2% by wt. of the 2,4'-isomer (see column 7, lines 50-52 of the '609 patent). Also, the Scholl et al reference only discloses one MDI composition that is all monomeric MDI. This monomeric MDI composition which contains 46-47% of the 2,4'-isomer, from 52-53% of the 4,4'-isomer and less than 1% of the 2,2'-isomer is also outside the scope of that which is presently required by the present invention. Applicants respectfully submit that since neither of the Slack et al references or the Scholl et al reference disclose an MDI composition that is within the scope of the present claims, combining these two references does **not** result in the presently claimed invention. This is correct regardless of what else might be disclosed by these references.

Isocyanate mixture 2 of the Scholl et al reference can be used to prepare a partially trimerized diphenylmethane diisocyanate which is a liquid trimer product as described therein (see Examples 7 and 8 in Table 1 at columns 5-6 of the '370 patent). It is readily apparent that the product of Example 7 does not contain allophanate groups as a hydroxyl group containing material is not present therein. This same MDI composition is used in Example 8. Although Example 8 of this reference contains a polyol component, this example is characterized by the Scholl et al reference as forming urethane groups, not allophanate groups (see Table 1 at columns 5-6). This is further discussed at column 3, lines 6-10 therein. Accordingly, one of ordinary skill in the art has no insight into the presently claimed invention which relates to stable liquid, allophanate-modified, partially trimerized diphenylmethane diisocyanates upon reading the Slack et al references in combination with the Scholl et al reference.

Applicants respectfully submit that, at best, this combination would lead the skilled artisan to substitute the MDI isomer mixture from Isocyanate mixture 2 of the Scholl et al reference into the process of the Slack et al references. This

“substitution” yields the process for preparing a partially trimerized isocyanate of the Slack et al references in which the isocyanate component is Isocyanate mixture 2 from the Scholl et al reference. This is clearly not Applicants’ invention. As discussed above, Isocyanate mixture 2 of the Scholl et al reference is outside the scope of the MDI mixture required by Applicants’ invention as the isomer distribution of the Scholl et al reference is not the same as that required by the present claims. Specifically, this isocyanate mixture contains from 46-47% of the 4,4’-isomer, from 52-53% of the 2,4’-isomer and less than 1% of the 2,2’-isomer. By comparison, the present invention requires a diphenylmethane diisocyanate component comprising from 10 to 40% by wt. of the 2,4’-isomer, from 0 to 6% by wt. of the 2,2’-isomer and from 54 to 90% by wt. of the 4,4’-isomer.

In addition, substituting the isocyanate described as Isocyanate mixture 2 of the Scholl et al reference for the MDI component described in the process of the Slack et al references would result in a product that contains isocyanurate groups, but no allophanate groups. Accordingly, this combination does not render the presently claimed invention obvious to one of ordinary skill in the art.

The Examiner requests clarification of Applicants’ previous comments concerning Examples 18 and 19 of the present application that a partially trimerized stable liquid product can not be obtained from a starting MDI composition having a 2,4’-isomer content of less than 38%, and further that one could not predict that a starting MDI having from 10 to 40% by wt. of the 2,4’-isomer would make a stable liquid. (See paragraph 5 of the Office Action dated January 8, 2006, bridging pages 3-4 therein.)

Applicants direct the Examiners’ attention to the fact that these examples (i.e. Examples 18 and 19) result in partially trimerized MDI products. In other words, these two examples are not allophanate-modified, partially trimerized diphenylmethane diisocyanates as required by the present claims. The products formed in these two examples do not contain allophanate groups as an alcohol or other OH group containing compound is not present therein. The Examiner’s attention is directed to the description of Example 18 on page 33, lines 5-12 and to the description of Example 19 on page 33, lines 14-17 of the present application. It is well known that OH group containing compounds are essential to the formation of

allophanate groups. Thus, Examples 18 and 19 of the present application do not contain allophanate-groups.

The MDI composition used to prepare the partially trimerized MDI product in Example 18 contained 100 pbw of MDI-1 and 100 pbw of MDI-2. Thus, this mixture contained about 72% of the 4,4'-isomer, about 27% of the 2,4'-isomer and about 1% of the 2,2'-isomer. It is evident that the isomer distribution of this MDI mixture falls within the scope of that required by Applicants' invention. However, in Example 18, the product was only partially trimerized (as no alcohol or other OH group containing compound was present). As disclosed on page 33, lines 5-12 of the present application, this product which was partially trimerized was turbid and contained about 15% solids.

In Example 19, a partially trimerized product was prepared from a MDI mixture of 60 pbw of MDI-1 and 140 pbw of MDI-2. This mixture has a total of about 61.5% of the 4,4'-isomer, about 37.5% of the 2,4'-isomer and less than 1% of the 2,2'-isomer. This isomer distribution is also within the scope of that required by the present invention. Example 19, like Example 18, did not contain an alcohol or other OH group containing compound so no allophanate groups were formed in the product. The partially trimerized MDI product formed in Example 19 was turbid with 10% solids (see page 33, lines 14-17 of the present application).

Applicants respectfully submit that these two examples which use MDI compositions which fall within the scope of the MDI compositions required by the present invention do not yield stable liquid, partially trimerized products. The present invention is directed to stable liquid, allophanate-modified, partially trimerized products. If one can not form stable liquid, partially trimerized products from the presently required MDI compositions as demonstrated by Examples 18 and 19, why would one skilled in the art expect to be able to form stable liquid, allophanate-modified, partially trimerized products from the same MDI compositions?

The other working examples of the present application illustrate that allophanate-modified, partially trimerized MDI products which are stable liquids can be formed from the presently required MDI compositions which have the specified isomer distribution. In particular, Example 3 contains about 12% by weight of the 2,4'-isomer and about 88% by weight of the 4,4'-isomer. Thus, in Example 3 the

isomer distribution is very close to the upper limit of the 4,4'-isomer and the lower limit of the 2,4'-isomer. Each of Examples 5 and 10-17 contain about 37.5% of the 2,4'-isomer, about 1% of the 2,2'-isomer and about 61.5% of the 4,4'-isomer. The blended product formed in Example 20 contains a similar isomer distribution as Examples 5 and 10-17. Thus, the isomer distribution in each of Examples 5, 10-17 and 20 is very close to the upper limit of the 2,4'-isomer and to the lower limit of the 4,4'-isomer. The remaining examples (i.e. Examples 1, 2, 4 and 6-9) have isomer distributions somewhere in-between these upper and lower limits. Since all of these examples also contain an alcohol compound, the products are allophanate-modified and partially trimerized. In addition, the products of these examples (i.e. Examples 1-17 and 20) are all clear liquid products (see page 30, lines 22-26, Table 1 on pages 31-32, and page 33, line 22 through page 34, line 10 of the present application).

Applicants respectfully submit that only after reading the present specification does it become "obvious" that one can prepare stable liquid products which are both allophanate-modified and partially trimerized from the presently required MDI compositions. Such a perspective does not, however, provide a proper basis for a rejection under 35 U.S.C. § 103(a).

The Slack et al references (U.S. 5,955,609 or U.S. 6,127,308) disclose by that some freeze-stable liquid TDI products which contain trimer groups can be formed. However, these references do not disclose that stable liquid partially trimerized products of HDI or MDI were made. This logically leads to the conclusion that freeze-stable liquid, partially trimerized HDI and/or MDI products were not made in the Slack et al references. Accordingly, the only information in the Slack et al references or the Scholl et al references about preparing liquid trimers based on MDI is that which is set forth in the Scholl et al reference.

As previously discussed, the Scholl et al reference does **not** provide one of ordinary skill in the art any insight into what isomer distribution is suitable for preparing the presently claimed stable liquid, allophanate-modified, partially trimerized diphenylmethane diisocyanate compositions. Examples 18 and 19 of the present application also illustrate that a stable liquid, trimer of MDI can not be

prepared from an MDI composition which contains less than about 38% by weight of the 2,4'-isomer of MDI. Thus, the only stable liquid trimer products in the Scholl et al reference are those prepared from MDI having a 2,4'-isomer content greater than about 38%. Accordingly, one of ordinary skill in the art could not reasonably expect to be able to prepare stable liquid, allophanate-modified, partially trimerized MDI products from the presently required MDI composition a)(1).

Applicants further submit that additionally combining the Slack et al references (U.S. 5,663,272, U.S. 6,991,746 or U.S. 6,887,399), the Rosthauser et al reference (U.S. 5,783,652) or the Markusch et al reference (U.S. 6,482,913) with the references discussed above does not render the presently claimed invention obvious to one of ordinary skill in the art.

Combining U.S. 5,662,272 with either of the Slack et al references (U.S. 5,955,609 or U.S. 6,127,308) and the Scholl et al reference (U.S. 5,124,370) would lead the skilled artisan to first react a monoisocyanate (such as phenyl isocyanate) with an organic compound to form a urethane as in the '272 patent, and then react this urethane with MDI having an isomer distribution as described therein (i.e. 0 to 60% of the 2,4'-isomer, less than 6% of the 2,2'-isomer and the balance being the 4,4'-isomer) or as in the Scholl et al reference (U.S. 5,124,370), with the catalyst system of the '609 or the '308 patents. Although this MDI isomer distribution overlaps with that required by Applicants' claims, the product would not contain both allophanate-groups and trimer groups as required by the present invention since no alcohol or other hydroxyl group containing compound would be included in the reaction.

As previously discussed, the Scholl et al reference describes only one monomeric MDI component (Isocyanate mixture 2) and this monomeric MDI component is outside the scope of that which is required by Applicants claims. In particular, this monomeric MDI component of the Scholl et al reference comprises 46-47% of the 4,4'-isomer, 52-53% of the 2,4'-isomer and less than 1% of the 2,2'-isomer. Thus, forming the urethane as described by U.S. 5,662,272 and reacting this with the monomeric MDI from the Scholl et al reference and using the catalyst system(s) of the primary references (i.e. Slack et al, U.S. Patents 5,955,609 and/or

6,127,308) does not result in the presently claimed invention. Therefore, the presently claimed invention is not properly rejected as being obvious over this combination of references.

Applicants also submit that combining U.S. 6,887,399 and/or U.S. 6,991,746, with U.S. Patents 5,955,609 and/or 6,127,308 (Slack et al references) and U.S. 5,124,370 (Scholl et al) also does not suggest the presently claimed invention to one of ordinary skill in the art. Rather, this combination of references would lead the skilled artisan to make a product from diphenylmethane diisocyanate using the specified isomer distribution in the '399 and the '746 patents. This MDI isomer distribution in these patents is broader than that required by the presently claimed invention. In particular, the '746 and the '399 patents describe that stable liquid polymeric allophanates can be prepared from MDI which contains from 0 to 60% by wt. of the 2,4'-isomer, less than 6% by wt. of the 2,2'-isomer and the balance being the 4,4'-isomer, with these %'s by wt. totaling 100% by wt. of the MDI. See column 2, lines 50-55 of the '746 patent.

Since the isomer distribution of the MDI component in the '746 and the '399 patents overlaps with the monomeric MDI component of Isocyanate Mixture 2 (see table at top of column 5) in the Scholl et al reference, the skilled artisan seeking to make an allophanate-modified, partially trimerized MDI product that is liquid would expect that the 2,4'-isomer of MDI should be present in amounts greater than 50% and that the 4,4'-isomer should be present in amounts less than 50% since these portions of the ranges disclosed by Slack et al ('746 and '399) overlap with those of the Scholl et al reference. This is not, however, Applicants' invention. It is respectfully submitted that one skilled in the art has no insight into the MDI isomer distribution required to prepare the presently claimed stable liquid allophanate-modified, partially trimerized diphenylmethane diisocyanates from the Slack et al references ('609 and/or '308) combined with the Scholl et al reference and the Slack et al references ('746 and/or '399). The present application contains several examples which demonstrate that partially trimerized MDI products are not stable liquids when using the presently required isomer distribution. See Examples 18 and 19. Thus, the skilled artisan has no reasonable basis to assume that stable liquid products which contain both allophanate-groups and trimer groups can be formed

from the presently required MDI component. Therefore, combining the Slack et al references (the '746 and/or the '399 patents) with the primary references (Slack et al; the '609 and the '308 patents) and the secondary reference (Scholl et al) does not fairly suggest the presently claimed invention to one of ordinary skill in the art.

The ranges of 2,4'-isomer and 4,4'-isomer which are disclosed as being suitable in the '746 and the '399 patents are overly broad as compared to those that actually work and/or are claimed in the present invention. Thus, the '746 and the '399 patents do not provide any insight to one skilled in the art into the presently required isomer distribution of the MDI component.

Only after reading the present specification does the presently required isomer distribution for MDI become "obvious" to one of ordinary skill in the art. Such a perspective does not, however, provide a proper basis for a rejection under 35 U.S.C. § 103(a). Accordingly, combining the '399 patent or the '746 patent with the previously cited references simply does not suggest the presently claimed invention to one skilled in the art.

It is also submitted by Applicants that combining the Rosthauser et al reference (U.S. Patent 6,887,399) with the primary references (the Slack et al patents; '609 and '308) and the secondary reference (the Scholl et al reference) does not properly suggest the presently claimed invention to one of ordinary skill in the art. The isomer distribution required by the Rosthauser et al reference is the same as that required by the Slack et al references (U.S. Patents 6,887,399 and 6,991,746) discussed above. See column 2, lines 47-53 of the '652 patent. Accordingly, combining the Rosthauser et al reference with the primary Slack et al references (the '609 and/or the '308 patents) and the Scholl et al reference adds nothing more to the rejection in terms of what isomer distribution of the MDI component would be considered by one of ordinary skill in the art. Applicants therefore submit that nothing "new" is added by including the Rosthauser et al reference in the rejection concerning the isomer distribution of the MDI.

The Rosthauser et al reference does, however, disclose that epoxides can be added to the urethane prepolymers of the allophanate-modified diphenylmethane diisocyanates therein to improve the reactivity (i.e. the epoxide increases the reactivity profile of the prepolymers with isocyanate-reactive components). See

column 2, lines 6-10. It is further disclosed by this reference, however, that an allophanate-modified MDI treated with an epoxide also exhibits increased reactivity with isocyanate-reactive components, but the epoxide treated allophanate-modified MDI is not storage stable in terms of NCO content and viscosity at temperatures of 25 to 50°C. Thus, it is unclear why the Examiner would rely on the Rosthauser et al reference in making this rejection.

It appears that the combination of the Rosthauser et al reference with the Slack et al references (the '609 and the '308 patents) and the Scholl et al reference either suggests making urethane prepolymers from allophanate-modified MDIs and trimerized products as in the Slack et al and the Scholl et al references, followed treating these with epoxides, or treating the allophanate-modified and trimerized products with epoxides. However, neither of these are the present invention. Also, as stated above with regard to the Slack et al '746 patent and the Slack et al '399 patent, the skilled artisan would select MDI having an isomer distribution that is outside the scope of that required by the present invention as he would expect the range of 2,4'-isomer and 4,4'-isomer that overlap with the Scholl et al reference to be useful. This isomer distribution of the Scholl et al reference is outside the scope of that required by the present invention. Accordingly, it is respectfully submitted that combining the Slack et al references (the '609 and the '308 patents) with the Scholl et al reference and the Rosthauser et al reference does not fairly suggest the presently claimed invention to one of ordinary skill in the art.

The present invention is also not "arrived at" by selectively combining only the isomer distribution from the Rosthauser et al reference with the trimer catalyst of the Scholl et al reference and the catalyst system of the Slack et al references ('609 and/or '308). As previously discussed concerning the Slack et al references (U.S. Patent 6,887,399) and U.S. Patent 6,991,746), the disclosed isomer distribution is overly broad for forming stable liquid products which contain both allophanate-groups and trimer groups in accordance with the present claims. It is at best unclear, what effect (if any) the epoxide of the Rosthauser et al reference would have on a product that contains both allophanate groups and trimer groups. Applicants therefore submit that the inclusion of the Rosthauser et al reference does not provide one skilled in the art any additional insight into the presently claimed invention. It is

readily apparent that the Examiner is selectively "picking and choosing" from the broad disclosures of these references to "arrive at" the present invention.

Finally, Applicants respectfully submit that the combining the Markusch et al reference (U.S. Patent 6,482,913) with the Slack et al references (U.S. 5,955,609 or U.S. 6,127,308) and the Scholl et al reference (U.S. 5,124,370) also does not fairly suggest the presently claimed invention to one of ordinary skill in the art.

As discussed above, the present invention is specific to stable liquid, allophanate-modified, partially trimerized diphenylmethane diisocyanate. By comparison, the Markusch et al reference is related to liquid polyisocyanate compositions which comprise an allophanate-modified MDI, a low molecular weight aliphatic dihydroxyl compound and an epoxide functional compound. Thus, the liquid polyisocyanates are prepolymers of allophanate-modified MDI which contain epoxide and have improved freeze stability. The combination of the Markusch et al reference with the Slack et al references (U.S. 5,955,609 or U.S. 6,127,308) and the Scholl et al reference (U.S. 5,124,370) does not result in presently claimed invention. One skilled in the art upon reading this combination of references would add an epoxide to urethane prepolymers of allophanate-modified MDI.

The MDI isomer distribution disclosed by the Markusch et al reference contains 0 to 20% by wt. of the 2,4'-isomer, from 0 to 2% by wt. of the 2,2'-isomer and the balance being 4,4'-isomer, with the sum of these totaling 100% by wt. of MDI (see column 4, lines 6-9 and lines 55-58). This MDI component is reacted with an aliphatic alcohol to form allophanate-modified MDI. It is evident that this isomer distribution overlaps with that of the present invention, but it is not identical to that required by Applicants' invention. The present invention requires from 10 to 40% of the 2,4'-isomer, less than 6% of the 2,2'-isomer and the balance is 4,4'-MDI (see Claim 1). What information would lead the skilled artisan to alter the disclosed MDI isomer distribution to that required by the present invention? Applicants submit that the present isomer distribution only becomes evident to the skilled artisan after reading Applicants specification. Such a perspective does not, however, provide a proper basis for a rejection under 35 U.S.C. § 103(a).

Furthermore, the Markusch et al reference specifically describes the addition of the epoxides to prepolymers of allophanate-modified MDI. Thus, this combination would suggest that a prepolymer of an allophanate-modified MDI or of a partially trimerized MDI be treated with an epoxide. These are not the present invention. Although prepolymers are the subject of withdrawn claims (see Claims 39-44) in the present application, these claims are not currently being prosecuted.

Applicants submit that this combination leads the skilled artisan to prepare prepolymers as in the Markusch et al reference, which contain an epoxide, with either the MDI isomer distribution therein or that of the Scholl et al reference, and either the trimer catalyst of the Scholl et al reference or the catalyst system of the Slack et al references (U.S. 5,955,609 or U.S. 6,127,308). These combinations are not the present invention.

Even if it is assumed that one skilled in the art only relies on the Markusch et al reference for the MDI isomer distribution therein, combining this isomer distribution with the catalyst system of the Slack et al references ('609 or '308) and/or that of the Scholl et al reference, does not result in the presently claimed invention. As previously discussed the isomer distribution of the Markusch et al reference does not clearly correspond to that of the present invention. Therefore the resultant products would not necessarily be stable liquids as required by the present invention. Nor would these products necessarily contain both allophanate-groups and trimer groups. Applicants respectfully submit that this combination of references does not fairly suggest the presently claimed invention.


The isomer distribution of the Markusch et al reference only suggests a different range of isomers to "try". Thus, it appears that the Examiner is applying an "obvious to try" standard of patentability. This is not the proper standard of under 35 U.S.C. § 103(a).

In view of the above remarks, Applicants respectfully submit that the presently claimed invention is not properly rejected as being obvious under 35 U.S.C. 103(a) over the Slack et al references (U.S. 5,955,609 or U.S. 6,127,308) in view of the Scholl et al reference (U.S. 5,124,370), and further in view of the Slack et al references (U.S. Patent 5,663,272, U.S. Patent 6,887,399 and U.S. Patent 6,991,746), the Rosthauser et al reference (U.S. Patent 5,783,652), and/or the

Markusch et al reference (U.S. Patent 6,482,913). Only after reading the present specification does the presently claimed invention become "obvious" to one of ordinary skill in the art. Such a perspective does not provide a proper basis for a rejection of the present claims under 35 U.S.C. 103(a).

Applicants therefore submit that each of these rejections are improper and request that these be withdrawn. It is respectfully requested that the present application be reconsidered in view of the preceding remarks. The allowance of Claims 1-18 is respectfully requested.

Respectfully Submitted,

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